

Scientific knowledge about infections by the new coronavirus in older adults: a scoping review

Conhecimento científico sobre infecções pelo novo coronavírus no idoso: scoping review

Conocimiento científico sobre las infecciones por el nuevo coronavirus en los ancianos: scoping review

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ABSTRACT

Objective: to map the scientific knowledge about COVID-19 in older adults. **Method:** this is a scoping review literature review. A search was performed in the PubMed, CINAHL, Web of Science and LILACS databases. Original articles that answered the guiding question were included: what scientific knowledge is available in the world about COVID-19 in older adults? **Results:** thirty-one articles were included, most of them carried out in China (n=23) and with a retrospective design (n=13) and case studies/case series (n=13). Based on the findings, six thematic categories emerged: clinical signs and symptoms (n=12), other information (n=9), adverse outcomes/complications resulting from COVID-19 (n=8), age relationship and greater severity of COVID-19 (n=8), variables related to death by COVID-19 (n=8), and diagnostic findings (n=8). **Conclusion:** the findings reinforce older adults' greater vulnerability to the worsening of COVID-19, as well as to complications resulting from the disease, including the greater occurrence of death.

Descriptors: Aged; Coronavirus; Severe Acute Respiratory Syndrome; Coronavirus Infections; Geriatric Nursing.

RESUMO

Objetivo: mapear o conhecimento científico sobre a COVID-19 no idoso. **Método:** revisão da literatura do tipo *scoping review*. Realizou-se uma busca nas bases de dados PubMed, CINAHL, Web of Science e LILACS. Incluíram-se os artigos originais que responderam à questão norteadora: quais os conhecimentos científicos disponíveis no mundo sobre a COVID-19 no idoso? **Resultados:** foram incluídos 31 artigos, a maioria realizada na China (n=23) e de delineamento retrospectivo (n=13) e estudos de casos/série de casos (n=13). Com base nos achados, emergiram seis categorias temáticas: sinais e sintomas clínicos (n=12); outras informações (n=9); desfechos adversos/complicações decorrentes da COVID-19 (n=8); relação da idade e maior gravidade da COVID-19 (n=8); variáveis relacionadas ao óbito pela COVID-19 (n=8); achados diagnósticos (n=8). **Conclusão:** os achados reforçam a maior vulnerabilidade do idoso ao agravamento da COVID-19, bem como as complicações decorrentes da doença, incluindo a maior ocorrência de óbito.

Descritores: Idoso; Coronavírus; Síndrome Respiratória Aguda Grave; Infecções por Coronavírus; Enfermagem Geriátrica.

RESUMEN

Objetivo: mapear el conocimiento científico sobre COVID-19 en ancianos. **Método:** revisión de la literatura del tipo *scoping review*. Se realizó una búsqueda en las bases de datos PubMed, CINAHL, Web of Science y LILACS. Se incluyeron artículos originales que respondieron a la pregunta orientadora: ¿qué conocimiento científico está disponible en el mundo sobre el COVID-19 en los ancianos? **Resultados:** se incluyeron 31 artículos, la mayoría realizados en China (n=23) y con un diseño retrospectivo (n=13) y estudios de casos/séries de casos (n=13). A partir de los hallazgos, surgieron seis categorías temáticas: signos y síntomas clínicos (n=12); otra información (n=9); resultados/complicaciones adversas resultantes de COVID-19 (n=8); relación de edad y mayor gravedad de COVID-19 (n=8); variables relacionadas con la muerte por COVID-19 (n=8); hallazgos diagnósticos (n=8). **Conclusión:** los hallazgos refuerzan la mayor vulnerabilidad de los ancianos al agravamiento del COVID-19, así como las complicaciones derivadas de la enfermedad, incluida la mayor ocurrencia de muerte.

Descriptores: Anciano; Coronavirus; Síndrome Respiratorio Agudo Grave; Infecciones por Coronavirus; Enfermería Geriátrica.

INTRODUCTION

COVID-19 is an acute respiratory disease caused by the new coronavirus (SARS-CoV-2)⁽¹⁾, which was declared a Public Health Emergency of International Concern and characterized as a pandemic on March 11, 2020⁽²⁾. The clinical picture of COVID-19, in most cases, has been reported as similar to other respiratory infections, with fever ($\geq 37.8^{\circ}\text{C}$), coryza, cough, usually dry and tired⁽³⁾. The reverse-transcriptase polymerase chain reaction (RT-PCR, polymerase chain reaction with reverse transcription) by nasopharyngeal swab was the reference standard for definitive diagnosis of infection with the new coronavirus⁽³⁾. However, it is estimated that 5% of those infected develop the most severe form of the disease, with symptoms of dyspnea and/or signs of pulmonary bleeding, severe lymphopenia, and kidney failure⁽³⁾.

Due to the physiological changes that occur with the human aging process and compromise the immune system, and the greater number of complications resulting from chronic diseases, older adults have been the most vulnerable to severe forms of COVID-19 and for evolution to death⁽⁴⁾. In an epidemiological cohort study conducted in China, most cases of COVID-19 and the worst prognosis for this disease were among older adults⁽⁵⁾. Supporting these findings, data demonstrated that the occurrence of death by COVID-19 increased exponentially from 3 to 5% among people aged 65–75 years, from 4 to 11% among people aged 75–85 years and from 10 to 27% among people aged 85 years and over. Moreover, people aged 65 and over represented 45% more hospital admissions, 53% of occupations in Intensive Care Units and 80% of deaths⁽⁶⁾. This leads to the belief that more comprehensive measures are needed to protect older adults.

In this regard, studies are needed to subsidize the care of health professionals to older adults with COVID-19 and, likewise, to give direction to sectoral and intersectoral actions under an integrating look among all instances involved in facing this pandemic situation. This scientific basis can support health teams' work, in order to develop interventions that can favor older adults' management and health care.

Given the above, the scoping review is considered a useful tool to identify and synthesize scientific knowledge⁽⁷⁾, especially in the COVID-19 pandemic, enabling planning care actions for older adults, which are foundations in evidence-based practice. Furthermore, assessment of studies may target priority areas that need to advance knowledge on this emerging topic.

OBJECTIVE

To map the scientific knowledge about COVID-19 in older adults.

METHODS

This is scoping review literature developed according to the Joanna Briggs Institute protocol⁽⁷⁾.

To develop the research question, Population, Concept and Context (PCC)⁽⁷⁾ was used, being: P - older adults; C - COVID-19; C - scientific knowledge. Thus, the guiding question was established: what scientific knowledge is available in the world about COVID-19 in older adults? Older adults were defined as persons

aged 60 and over⁽⁸⁾; COVID-19 was considered to be the disease caused by the new coronavirus (2019 novel coronavirus, acronym 2019-nCoV)⁽¹⁾.

As an eligibility criterion, original articles, case reports and case series were all considered, all about COVID-19 and with data referring to older adults, from December 2019, when the first study on said disease⁽¹⁾. Letters to the editor, opinion articles, and reflection articles were excluded.

Search strategy

In the first stage, a search was carried out in the National Library of Medicine National Institutes of Health (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases, in which titles, abstracts and descriptors found were analyzed. In the second stage, all keywords and descriptors were used to identify the articles in other databases: Web of Science and Latin American and Caribbean Literature in Health Sciences (LILACS). In the third stage, the studies published on the PubCovid-19 platform (<http://pubcovid19.pt/index.php>), which covers articles published on COVID-19, divided into several themes, were analyzed as an additional source. Studies on the theme "older adults" were considered.

Search for primary studies was carried out on April 17, 2020. To that end, controlled and uncontrolled descriptors were delimited according to the databases using advanced search tools, i.e., the selected descriptors were crossed and combined using the Boolean operators "AND" and "OR". The controlled descriptors (MESH) adopted in search strategy for primary studies were "Coronavirus, Coronavirus Infections", "Severe Acute Respiratory Syndrome", "SARS Virus" and "aged", "aged, 80 and over".

Considering that there are no specific descriptors available for the new coronavirus and that the first case of the disease was reported in December 2019⁽¹⁾, the time frame was used to search the databases for primary studies (December 2019 until the data collection time).

Study selection and data extraction

The articles found were imported into the program on the Web Endnote - Clarivate Analytics (<https://access.clarivate.com/login?app=endnote>) for identification and exclusion of duplicates. Subsequently, the Rayyan QCRI - Qatar Computing Research Institute (<https://rayyan.qcri.org/welcome>) program was used to manage the selection process of the final sample.

For data extraction, a script was elaborated containing information related to authorship, year and place of publication, type of study, participants, study period, and results. Article assessment and data extraction were conducted by two independent reviewers (NGNO and MADR), with disagreements sorted out by a third reviewer (AFB).

Analysis of evidence

Data synthesis was performed descriptively considering the construction of thematic categories, which addressed the results of original studies on COVID-19 in older adults worldwide.

RESULTS

The Preferred Reporting Items for Systematic Review and Meta-Analyses for Scoping Reviews (PRISMA)⁽⁹⁾ was used to present the article selection steps (Figure 1).

In the first stage, 440 articles were found in the databases and 79 identified in the PubCovid-19 Platform, 103 of which were excluded by duplicate. After reading all titles and abstracts, 92 articles were included for reading in full, in order to answer the research question. Studies that did not meet the inclusion criteria (n=61) were excluded due to different population (n=19), study design (n=37), and others (n=5). Therefore, 31 articles made up the final sample of this scoping review (Figure 1).

Of the 31 articles analyzed, all were published in 2020 and the majority in China (n=23). Case report (n=13) and retrospective (n=13) studies figured prominently, which aimed mainly to investigate the epidemiological, clinical and diagnostic characteristics of COVID-19.

With regard to case studies/case series (n=13), a large part (n=6) occurred in January 2020 aiming to report, by and large, the clinical characteristics, the diagnostic findings and the prospects for treatment of the first confirmed cases for COVID-19. Other information was highlighted in these reports, such as: improvement of serial laboratory parameters and oxygenation with the infusion of plasma in treatment of two older adults hospitalized with COVID-19⁽¹⁰⁾; the best clinical evolution of a female older adult immunocompromised in relation to her immunocompetent spouse⁽¹¹⁾; syncope⁽¹²⁾, malnutrition⁽¹³⁾ and rhabdomyolysis⁽¹⁴⁾ in cases of older adults with COVID-19; and diagnostic findings by computed tomography⁽¹⁵⁻¹⁷⁾ (Chart 1).

The synthesis of scientific knowledge was distributed in two groups according to study design, the first being case reports/case series (n=13) (Chart 1); and the second according to other scientific results (n=18) about COVID-19 in older adults (Chart 2).

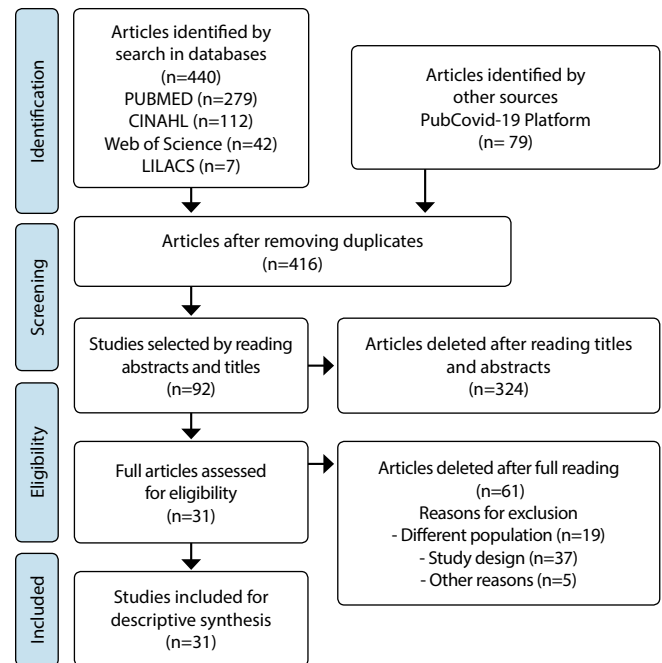


Figure 1 - Flow diagram of study selection in the databases according to Preferred Reporting Items for Systematic Review and Meta-Analyses for Scoping Reviews (PRISMA)⁽⁹⁾

Chart 1 - Characteristics of case reports or case series on COVID-19 in older adults according to authorship, year of publication, country, type of study, study participants, period, and main results

Author, year, and country	Type of study	Study participants/period	Main results
Ahn YJ et al., 2020 (Korea) ⁽¹⁰⁾	Case studies	- 02 patients with COVID-19 with acute respiratory syndrome (71 years and 67 years). - Period: February and March 2020.	-When receiving lopinavir/ritonavir and hydroxychloroquine, older adults maintained persistent fever, hypoxemia, and progressive bilateral infiltrations. - After plasma infusion, patients showed improvement in oxygenation and chest X-ray, and a decrease in inflammatory markers and viral loads. - After application of methylprednisolone, before plasma infusion, there was a rapid improvement in serial laboratory and oxygenation standards.
Valentina S, Alessio P, Hans-Ulrich I, 2020 (Italy) ⁽¹¹⁾	Case studies	- 02 patients with COVID-19 (couple), the woman being treated with chemotherapy for recurrent breast cancer, and her husband considered healthy (controlled hypertension). Both 60 years old. - Period: March 2020.	- Both patients were treated with darunavir/cobicistat and hydroxychloroquine. - The immunocompromised woman evolved, without the need for intensive care and was discharged after 6 days. - The husband needed intensive care and his recovery was slow, although he was also discharged from the hospital.
Chantal Tapé BA et al., 2020 (United States) ⁽¹²⁾	Case study	- 01 female older adult with COVID-19 (79 years). - Period: not specified.	- Older adult with previous cardiovascular disease presented with syncope episode; she was afebrile, with a normal chest X-ray and with no suspicion of COVID-19. - In 03 days, she developed a fever and tested positive for COVID-19. - Syncope may be a symptom of COVID-19 in older adults with cardiovascular diseases.
Yuan Y et al., 2020 (China) ⁽¹³⁾	Case series	- 06 patients with COVID-19, being 04 older adults (02 men - 65 and 64 years old; and 02 women - 64 and 71 years old). -Period: January 2020	- All older adult patients had malnutrition; - Nutritional status can be useful in identifying older adults at high risk with COVID-19.

To be continued

Chart 1 (concluded)

Author, year, and country	Type of study	Study participants/period	Main results
Suwanwongse K et al., 2020 (United States) ⁽¹⁴⁾	Case study	- 01 patient with COVID-19 (88 years). - Period: not specified.	- Patient with hypertension, chronic kidney disease, heart failure with reduced ejection fraction, benign prostatic hypertrophy, bilateral knee osteoarthritis, and mild cognitive impairment. - Entered the emergency room with symptoms of rhabdomyolysis, including muscle pain and weakness. - In the initial assessment, she had low fever, tachypnea, and 94% oxygen saturation. - The COVID-19 polymerase chain reaction test of the nasopharyngeal swab was positive.
Chen X et al., 2020 (China) ⁽¹⁵⁾	Case study	- 03 patients with COVID-19, one of whom is an older adult (67 years old). Period: not specified.	- Chest CT scan without contrast showed multiple, bilateral, irregular ground-glass opacities with a paving pattern. Using an antiviral (Abidore) did not help to reduce the patient's temperature, nor to improve her breathing pattern. - After four days, chest computed tomography was repeated, and demonstrated increased multiple consolidation, ground-glass nodules and ground-glass nodules adjacent to the pleura. - The patient received intravenous administration of methylprednisolone (40 mg qd), oral administration of γ-immunoglobulin and traditional Chinese medicine and non-invasive positive pressure ventilation. The dynamic computed tomography showed irregular consolidation and partially absorbed nodules, indicating that the symptoms were alleviated.
Moreira BL et al., 2020 (Brazil) ⁽¹⁶⁾	Case study	- 01 older adult with COVID-19 (73 years). - Period: not specified.	- On chest radiography, he presented ill-defined pulmonary opacities, notably on the periphery of the left lung. - On chest computed tomography, he presented ground-glass opacities, predominantly peripheral, involving all pulmonary lobes.
Quin C et al., 2020 (China) ⁽¹⁷⁾	Case series	- 04 patients with COVID-19, 01 older adult (woman and 61 years old) - Period: January 13 th to 20 th , 2020	- The older adult patient had back pain and a dry cough, mild leukopenia, peripheral ground-glass opacities, and pulmonary consolidations in more than two pulmonary lobes.
Lescure FX et al., 2020 (France) ⁽¹⁸⁾	Case study	- 05 patients with COVID-19, one of whom is an older adult (80 years old). - Period: January 2020.	- The older adult patient presented rapid evolution to multiple organ failure and high and persistent viral load in the lower and upper respiratory tract. - The older adult patient died 24 days after the disease; and everyone else recovered and was discharged.
Okada P et al., 2020 (China) ⁽¹⁹⁾	Case study	- 02 female older adults with COVID-19 (60 years and 70 years). - Period: January 2020.	- Genomes of the cases are identical. These genomes have no direct link to the Huanan Seafood Market, but their genomes are identical to four Wuhan strings, collected on December 30, 2019, indicating a potentially wider distribution in the city.
Wang Z et al., 2020 (China) ⁽²⁰⁾	Case series	- 04 patients with COVID-19, 02 older adults (63-year-old woman; 63-year-old man). - Period: January 21 th and 24 th , 2020.	- Signs and symptoms in older adult patients: fever and cough. The woman also had vertigo and constipation. - On tomography, the man presented unilateral pneumonia, and the older adult, bilateral. - Both older adults received oxygen therapy, treatment with antibiotics and antivirals with lopinavir/ritonavir (Kaletra [®]), arbidol and Shufeng Jiedu Capsule. The woman was on mechanical ventilation. - The man improved the symptoms associated with pneumonia, and the first test was negative. - At the end of data collection, the woman showed signs of improvement in pneumonia.
Zang W, 2020 (China) ⁽²¹⁾	Case study	- 01 male older adult (75 years old). - Period: not specified.	- Hypertensive and diabetic older adults were diagnosed with severe COVID-19 pneumonia associated with Severe Acute Respiratory Syndrome and septic shock. - In the physical exam he did not present fever; however, even though using non-invasive oxygen therapy, oxygen saturation was 91%. - The three-dimensional reconstruction of bilateral lung injuries provided a fundamental clue for early identification of COVID-19.
Chan JFW et al., 2020 (China) ⁽²²⁾	Case study	06 people, 05 with a diagnosis of COVID-19, being 03 older adults, 02 female (65 and 66 years old) and 01 male (66 years old). Period: January 2020.	- Older adults showed more systemic symptoms (fever ≥38.2°C), extensive ground-glass radiological changes, lymphopenia, thrombocytopenia and increased levels of C-reactive protein and lactic dehydrogenase.

As for other designs of the studies (n=18) (Chart 2), it was found that two were carried out only with older adults, in the others (n=16), participants were constituted by the general population, which presented results on COVID-19 stratified according to age group, which included older adults. The number of study participants ranged from 17⁽¹⁾ to 13,909⁽²³⁾ older adults, with heterogeneous selection criteria, being: confirmed diagnoses of COVID-19^(6,24-31); pneumonia by COVID-19^(1,31-33); adults with one

or more morbidities⁽³⁴⁾; deaths associated with COVID-19^(23,35); suspected cases⁽³²⁾ and confirmed symptomatic of the disease⁽³⁶⁾. The sample data, from most surveys, were related to the period of January and/or February (n=13). The consecutive and non-probabilistic sample was used in 17 studies (Chart 2).

Based on the findings of the studies included in this scoping review (n=31), six thematic categories of the main results of studies on COVID-19 in older adults were listed, as shown in Chart 3.

Chart 2 - Characteristics of scientific knowledge about COVID-19 in older adults according to authorship, year of publication, country, type of study, study participants, period, and main results

Author, year, and country	Type of study	Study participants/Period	Main results
Zhang G et al., 2020 (China) ⁽¹⁾	Retrospective study	-95 patients with pneumonia by COVID-19, 17 of whom are older adults (> 60 years old). - Period: January 16 th to February 25 th (2020).	- 41.2% of older adults were severe cases of COVID-19 and reached the compound endpoint (admission to an Intensive Care Unit, mechanical ventilation, or death).
Pan A et al., 2020 (China) ⁽⁵⁾	Cohort study	- 32,583 patients with COVID-19, 13,818 older adults (≥ 60 years old). - Period: December 8 th (2019) to March 8 th (2020).	- The risk of severity of COVID-19 increased with age. Older adults aged 80 years or older had a higher risk of having severe COVID-19 (41.3%; OR: 3.61 [95% CI, 3.31-3.95]).
Verity R et al., 2020 (China) ⁽²³⁾	Analytic study	- 194 deaths and 30,763 infected in people <60 years old/829 deaths and 13,909 infected people aged ≥60 years old - Period: cases reported in China until February 8 th and outside China until February 25 th (2020).	- The estimated rate, by the parametric method, of case fatality was lower in those under 60 years old (1.4% [0.4-3.5]) compared to those aged 60 and over (4, 5% [1.8-11, 1]). - It was observed a higher proportion of more severe cases as the age group increases: 11.8% (7.01-24.0) between 60-69 years old; 16.6% (9.87-33.8) between 70-79 years old and 18.4% (11.0-37.6) ≥80 years.
Lian J et al., 2020 (China) ⁽²⁴⁾	Retrospective study	- 788 patients with COVID-19, 136 older adults (≥ 60 years old). - Period: January 17 th to February 12 th (2020).	-The presence of comorbidities was higher in older adults (55.1%) compared to younger ones (21.9%) (p <0.001). - Higher proportion of older adults among the most severe patients (16.2%; p <0.001) and critically ill (8.8%; p <0.001), with shortness of breath (12.5%; p <0.001) and fever > 39.0°C (14.0%; p=0.010). - There was no statistically significant difference between the groups regarding the time of disease onset and first consultation (p=0.867), confirmation of diagnosis (p=0.410), and hospitalization (p=0.945). - The highest proportion of admissions to Intensive Care Units (9.56%; p <0.001) and applications of methylprednisolone (28.68%; p <0.001) was among older adults.
Grasselli G et al., 2020 (Italy) ⁽²⁵⁾	Retrospective study	- 1,591 patients with COVID-19, 961 older adults (≥ 61 years). - Period: February 20 th to March 18 th (2020).	- All long-lived patients (100%) and 76% of older adults aged 60 and over had at least one comorbidity. - Invasive mechanical ventilation was used in 89% of older adults. - Non-invasive ventilation was used in 10% of older adults. - Mortality in Intensive Care Units was higher in older adults (36%; p <0.001). - Percentage of patients discharged from Intensive Care Units was lower among older adults (11%; p <0.001).
Wang L et al., 2020 (China) ⁽²⁶⁾	Retrospective study	- 339 older adults (> 60 years) with COVID-19. - Period: January 1 st to February 6 th (2020).	- Mean age was 71 ± 8 years; 51% were female; 23.6% were critically ill patients; 46.9% were critically ill patients; 29.5% were moderate cases. - Common comorbidities: hypertension (40.8%), diabetes mellitus (16.0%), and cardiovascular diseases (15.7%). The most common symptoms were fever (92.0%), cough (53.0%), dyspnea (40.8%), and fatigue (39.9%). - Lymphocytopenia was a common laboratory finding (63.2%). - Common complications: bacterial infection (42.8%), abnormalities of liver enzymes (28.7%), and acute respiratory distress syndrome (21.0%). - 26.8% were discharged and 19.2% died. - A shorter length of stay was found among those who died (5 days) compared to survivors (28 days) (p <0.001). - Dyspnea symptoms (OR: 2.35; p=0.001), comorbidities, including cardiovascular disease (OR: 1.86; p=0.031) and chronic obstructive pulmonary disease (OR: 2.24; p=0.023) and syndrome acute respiratory distress (OR: 29.33; p <0.001) were strong predictors of death. A high level of lymphocytes was predictive of a better result (OR: 0.10; p <0.001).

To be continued

Chart 2

Author, year, and country	Type of study	Study participants/Period	Main results
Chen TL et al., 2020 (China) ⁽²⁷⁾	Retrospective study	- 203 patients with COVID-19, 55 older adults (≥ 65 years). - Period: January 1 st to February 10 th (2020).	- Among patients aged 65 and over, the mortality rate was 34.5%, significantly higher than that of older adults ≤ 65 years of age (4.7%) ($p < 0.001$). - Common symptoms of older adult patients with COVID-19 included fever (94.5%), dry cough (69.1%), and dyspnea (63.6%). - Older adults aged 65 and over had higher initial comorbidities ($p < 0.001$), more severe symptoms ($p < 0.001$) and more likely to multiple organ failure ($p < 0.001$), compared to younger patients.
Wu J et al., 2020 (China) ⁽²⁸⁾	Retrospective study	- 280 patients infected with SARS-CoV-2, being 69 older adults (≥ 65 years old). - Period: January 20 th to February 19 th (2020).	- Among the older adults, a greater proportion of the severe condition of the disease was evidenced in relation to the mild one ($p < 0.001$). - In an multivariate analysis, the age group of 65 years and over was an independent risk factor for COVID-19 (OR=81.2; CI=1.10-5988.12).
Chen Z et al., 2020 (China) ⁽²⁹⁾	Retrospective study	- 98 patients with COVID-19, 20 older adults (≥ 60 years old). - Period: January 20 th to February 17 th (2020).	- Differences between clinical manifestations (fever and sputum) in infected patients of different age groups were not statistically significant ($p > 0.05$), nor was there a statistically significant difference in the interval between the first onset of symptoms and high-resolution computed tomography ($p = 0.921$). - A greater number of cases of bilateral pulmonary involvement was found in patients ≥ 60 years old in relation to the others ($p < 0.05$). - The number of lung lesions observed by high-resolution computed tomography in patients aged 60 years or older was higher compared to those younger than 18 years old ($p = 0.019$). - Involvement of peripheral lung injuries in the older adult group was greater than the group of children under 18 years old ($p = 0.005$).
Wang R et al., 2020 (China) ⁽³⁰⁾	Descriptive study	- 125 patients diagnosed with COVID-19, 14 older adults (≥ 59 years old). - Period: January 20 th to February 9 th (2020).	- Patients were classified as non-critical (mild, common) and critical (severe; critical). Critical patients were older ($p = 0.003$) and had more underlying disease than non-critical patients ($p = 0.009$).
Li Q et al., 2020 (China) ⁽³¹⁾	Descriptive study	- 425 patients with pneumonia caused by the new coronavirus, 240 older adults (≥ 60 years old). - Period: until January 22 th (2020).	- Characteristics of the cases in three periods: the first period was for patients with disease onset before January 1 st , the date on which the Huanan Wholesale Seafood Market was closed (older adults - 65 years and over - represented 23%); the second period was for those beginning between 1 and 11 January, which was the date on which the RT-PCR reagents were supplied to Wuhan (older adults - 65 years or older - represented 42%); and the third period were those with onset of the disease on or after January 12 (older adults - 65 years or older - represented 37%). - It was noted that few of the first cases occurred in children, and almost half of the 425 cases were in adults aged 60 years and over.
Liu K et al., 2020 (China) ⁽³²⁾	Retrospective study	- 56 patients with COVID-19 pneumonia, 18 older adults (≥ 60 years old). - Period: January 15 th to February 18 th (2020).	- 22.3% of older adults received mechanical ventilation in an Intensive Care Unit. - 5.56% of older adults died; - Proportion of older adults with severe grade IV and V pneumonia index was higher than that of young and middle-aged patients ($p < 0.001$). - Proportion of impairment of multiple lung lobes was higher in the older adult group, compared to the young and middle-aged group ($p < 0.001$). - Proportion of lymphocytes in the older adult group was lower compared to the young and middle age group ($p < 0.001$). - The older adults, compared to the younger group, presented higher percentages of complications during hospitalization, being: severe acute respiratory syndrome (22.2%; 5.3%), acute cardiac injury (16.7%; 10.5%), acute liver and kidney injury (38, 9%; 7.9%), secondary infection (22.2%; 13.2%) and shock (5.6%; 5.3%), respectively. However, the difference was not significant ($p = 0.337$).
Chen N et al., 2020 (China) ⁽³³⁾	Retrospective study	- 99 patients with 2019-nCoV pneumonia, 37 older adults (≥ 60 years old). - Period: January 1 st to 20 th (2020).	- 11.0% died, seven of whom were 60 years old and over. - The first two deaths were male, had no chronic diseases and were 61 (patient 1) and 69 years old (patient 2). Both patients had severe pneumonia and severe acute respiratory syndrome after hospitalization, being transferred to the Intensive Care Unit, where they received respiratory therapy assisted by an intubated ventilator. The intervals between the onset of symptoms and the use of ventilator-assisted breathing in the two patients were 3 and 10 days, respectively. The course of the disease and lung injuries progressed rapidly in both cases and both developed multiple organ failure in a short time.

To be continued

Chart 2 (concluded)

Author, year, and country	Type of study	Study participants/Period	Main results
Wolf MS et al., 2020 (United States) ⁽³⁴⁾	Cross-sectional study	- 630 adults with one or more comorbidities, being 153 older adults (≥ 65 years old). - Period: March 13 th to 20 th (2020).	- The threat of a COVID-19 outbreak was rated as most serious by older adults aged 70 and over. - Older adults showed less knowledge about the prevention and symptoms of COVID-19 compared to young people, but no significant difference was identified.
Kirigia JM et al., 2020 (China) ⁽³⁵⁾	Retrospective study	- 2,595 deaths associated with COVID-19. - Period: from February 24 th , 2020.	- Deaths by COVID-19 had a total discounted tax value (by 3%) of 924,346,795 international dollars in China. Being, 27.8% with people from 50 to 64 years old and 9.0% among those with 65 years old and over.
Zhu T et al., 2020 (China) ⁽³⁶⁾	Retrospective study	- 72 symptomatic patients with COVID-19, 28 older adults (> 60 years old). - Period: January 18 th to February 3 rd (2020).	- Patients were divided into two groups, being: young group (n=44; 47.5 ± 8.7 years old) and older adult group (n=2; 68.4 ± 6.0 years old). - The proportion of involvement of the pulmonary lobes was higher in the older adult group (71.4%) compared to the young group (36.4%) (p=0.009). - The subpleural line (50.0%; p=0.030) and pleural thickening (71.4%; p=0.011) occurred in a greater proportion among older adults, compared to the young group (25.0%; 40, 9%, respectively).
Liu R et al., 2020 (China) ⁽³⁷⁾	Retrospective study	- 4,880 nucleic acid (NAT) tests, with 1449 older adults (≥ 60 years old). - Period: January 22 th to February 14 th (2020).	- There was a higher proportion of positive NAT test rates as the age group increased, with 61.81% for cases > 70 years and 47.86% between 60 and 69 years old ($\chi^2= 58.835$; p < 0.001). - The positive test in fever clinics had a higher significant proportion among those older (p < 0.001), being 57.33% and 76.69% among those aged 60 to 69 years and > 70 years old, respectively. - Binary logistic regression analysis showed that age was the risk factor for SARS-CoV infection (OR=1033; CI=1.029-1.037).
Wang Z et al., 2020 (China) ⁽³⁸⁾	Retrospective study	- 69 patients with confirmed SARS-CoV-2 infection. - Period: January 16 th to 29 th (2020).	- The cases were divided into two groups: adequate saturation ($SpO_2 \geq 90\%$) and inadequate saturation ($SpO_2 < 90\%$). - The mean age for the $SpO_2 \geq 90\%$ group was 37.0 years, while for $SpO_2 < 90\%$, it was 70.5 years. - All deaths occurred in the $SpO_2 < 90\%$ group formed by older patients, with more comorbidities and higher plasma levels of IL6, IL10, lactate dehydrogenase and C-reactive protein.

As for outcomes/complications resulting from COVID-19 (n=8), there was a higher proportion of hospitalizations in older adults in Intensive Care Units⁽²⁴⁾, severe pneumonia⁽³²⁾ and a lower proportion of discharge in these units in relation to the younger groups⁽²⁵⁾. Descriptively, higher percentages of other complications resulting from the disease were identified in older adults, such as mortality^(23,25,27,35), severe acute respiratory syndrome^(26,37), cardiac injuries⁽³²⁾, hepatic injuries^(26,32) and acute renal injuries⁽³²⁾, secondary infection^(26,32), shock, acute respiratory distress syndrome⁽²⁶⁾,

multiple organ failure⁽¹⁸⁾, pneumonia⁽³¹⁾, and use of mechanical ventilation⁽²⁵⁻³⁴⁾ (Chart 3).

Those with advanced age had a higher severity of COVID-19^(5,23-24,27-28,30,32,34) (n=8). Likewise, advanced age was related to the occurrence of death by COVID-19^(17,23,25,27) (n=4). Also related to death: occurrence of acute respiratory distress syndrome and obstructive pulmonary disease, presence of comorbidities and symptoms of dyspnea⁽²⁶⁾, and greater development of serious charts^(5,23,28,32) (Chart 3).

Chart 3 - Thematic categories of the main results on COVID-19 in older adults

Thematic categories (number of articles)	Results of studies
Adverse outcomes/ Complications from COVID-19 (n=8)	Higher proportion of hospitalizations in Intensive Care Units ⁽²⁴⁾ and severe pneumonia ⁽³²⁾ ; Lower proportion of discharge from Intensive Care Units ⁽²⁵⁾ ; High occurrence of composite endpoint (Intensive Care Unit and/or mechanical ventilation and/or death) ⁽¹⁾ ; High use of mechanical ventilation ^(25,32) ; Higher mortality rate ^(23,25,27,33) ; Higher percentages of complications during hospitalization: severe acute respiratory syndrome ^(26,37) ; injuries - acute cardiac ⁽³²⁾ , hepatic ^(26,32) and acute renal ⁽³²⁾ ; secondary infection ^(26,32) ; shock ⁽³²⁾ ; acute respiratory distress syndrome ⁽²⁶⁾ ; multiple organ failure ⁽¹⁸⁾ and pneumonia ⁽³¹⁾ .
Relationship between COVID-19 age and severity (n=8)	Advanced age ^(5,23-24,27-28,30-32,34) .
Variables related to death by COVID-19 (n=8)	Acute respiratory distress syndrome and chronic obstructive pulmonary disease ⁽²⁶⁾ ; Advanced age ^(17-18, 23,25,27) ; Presence of comorbidities and symptoms of dyspnea ⁽²⁶⁾ ; Greater development of serious charts ^(5,23,28,32)

To be continued

Chart 3 (concluded)

Thematic categories (number of articles)	Results of studies
Other information (n=9)	High costs related to deaths due to COVID-19 ⁽³⁵⁾ High prevalence of comorbidities in older adults and/or a higher proportion in relation to young people ^(24-25,27) ; Common comorbidities: hypertension, diabetes mellitus and cardiovascular diseases ⁽²⁶⁾ ; Higher occurrence of infection by the new coronavirus in older adults ⁽³⁷⁾ ; Treatment of COVID-19 with plasma infusion ⁽¹⁰⁾ ; Clinical evolution of COVID-19 in an immunodepressed patient ⁽¹¹⁾ ; Genomic characteristics ⁽¹⁹⁾ .
Clinical signs and symptoms (n=12)	Dyspnea ^(24,26-27) ; Fever ^(12,20,22-24,26-27) ; Cough ^(17,20,26-27) ; Vertigo and constipation ⁽²⁰⁾ ; Fatigue ⁽²⁶⁾ Lower oxygen saturation rates (<90%) ⁽³⁸⁾ (<91%) ⁽²¹⁾ ; Syncope ⁽¹²⁾ ; Malnutrition ⁽¹³⁾ ; Rhabdomyolysis ⁽¹⁴⁾ .
Diagnostic findings (n=8)	Greater involvement of the pulmonary lobes in relation to young people ^(32,36) ; Higher proportion of subpleural line and pleural thickening compared to young people ⁽³⁶⁾ ; Lower proportion of lymphocytes ⁽³²⁾ ; Lymphocytopenia ⁽²⁶⁾ ; Higher number of lung injuries observed ⁽²⁹⁾ ; Greater bilateral pulmonary involvement and peripheral injuries ⁽²⁹⁾ ; Ground-glass opacities involving the pulmonary lobes ^(15-17,22) .

Also, the high cost resulting from deaths from the disease stands out⁽³⁵⁾; high prevalence of comorbidities among infected older adults, especially hypertension, diabetes mellitus and cardiovascular diseases⁽²⁶⁾; higher occurrence of COVID-19 infection in older adults⁽³⁷⁾; treatment of COVID-19 with plasma infusion⁽¹⁰⁾; and clinical analysis of COVID-19 in an immunocompromised patient⁽¹¹⁾ and genomic characteristics of the virus⁽¹⁹⁾ (n=9) (Chart 3).

With regard to studies that addressed the clinical signs of the disease in older adults (n=12), the results identified dyspnea^(24,26-27), dry cough^(17,20,26-27), fever^(12,20,22-24,26-27), and fatigue⁽²⁶⁾, in addition to lower oxygen saturation rates^(21,38). Symptoms of dizziness, constipation⁽²⁰⁾, syncope⁽¹²⁾, malnutrition⁽¹³⁾ and rhabdomyolysis⁽¹⁴⁾ (Chart 3) were also reported.

The diagnostic findings by computed tomography (n=8) identified changes in the lungs, in particular, the involvement of the pulmonary lobes^(32,36). They also found a lower proportion of lymphocytes in older adults compared to young people⁽³²⁾ and the occurrence of lymphocytopenia⁽²⁶⁾ (Chart 3).

DISCUSSION

The current study is one of the first to map scientific knowledge about infection with the new coronavirus in older adults. Mapping the literature, which deals with aspects related to COVID-19 in this population, allowed to outline the different contexts of investigations with this theme, with regard to adverse outcomes/complications, the relationship of age and greater severity of the disease, deaths, clinical signs, diagnostic findings, and other information.

Most of studies in this review concentrated in China, because the outbreak started in this country⁽¹⁾, and presented a descriptive design, with non-probabilistic and consecutive samples. The option for the design, possibly, was due to the emergency nature of building knowledge about the COVID-19 pandemic. However, the set of findings shows that there are still few studies in the world, which were carried out specifically with older adults, highlighting

the need to expand scientific knowledge on this topic. Thus, it is necessary to increasingly qualify scientific productions according to the evolution of the pandemic and, therefore, to advance in knowledge about the dynamics of the disease and its impact on society, on older adults, and their families.

The greater likelihood that older adults will develop complications from infection with the new coronavirus compared to the general population was identified in this review. The analysis of information on adverse outcomes related to COVID-19 in older adults, such as progression of disease severity and hospital discharge, can provide information to guide the most effective treatment of the disease⁽³⁹⁾ in managing care and health service resources.

It also favors organization of work in primary care, which, in addition to maintaining continuity of care for chronic diseases, should also undertake health surveillance actions. In this perspective, nurses, based on the situational health diagnosis, will be able to identify the most vulnerable older adults and promote health education. The approach to older adults' social support network provides the capillarity of effective information on preventive measures and care related to COVID-19, postponing its adverse effects.

It is noteworthy that the mortality in the SARS-CoV-2 pandemic in older adults has also been observed in some studies^(18,23,25,27,33), with advanced age related to this outcome^(5,18,23-25,27-28,30,32,34). The highest proportion of severe pneumonia⁽³¹⁻³²⁾, associated with severe acute respiratory syndrome^(26,37), acute cardiac⁽³²⁾, liver^(26,32) and acute kidney⁽³²⁾ injuries, secondary infection^(26,32), shock⁽³²⁾, acute respiratory distress syndrome⁽²⁶⁾, multiple organ failure⁽¹⁸⁾ and use of mechanical ventilation⁽²⁵⁻³²⁾ are the main outcomes related to the severity of the cases with worst prognosis. As a consequence, the use of mechanical ventilation^(25,32) and hospitalization in Intensive Care Units^(1,24) is high as well as the lower proportion of discharge in these hospital units.

Likewise, acute respiratory distress syndrome and chronic obstructive pulmonary disease⁽²⁶⁾, old age^(18,23,25,27), presence of comorbidities and dyspnea symptoms⁽²⁷⁾, and the greater

development of serious charts^(5,25,28,32) are responsible for the high death rate by COVID-19 in older adults. This relationship may be linked to physiological changes in the immune system resulting from the aging process as well as the greater number and complications of chronic diseases in older adults⁽⁴⁾. The variables related to higher probability of death in older adults, verified in this review, contribute to outline the characteristics of older adults who are at higher risk for this outcome.

Therefore, attention is needed to the particularities of the development of the clinical picture in older adults. Dyspnea^(24,26-27), fever^(12,20,22-24,26-27), cough^(19-20,26-27), fatigue⁽²⁸⁾, and lower oxygen saturation rates (<90%)^(21,38) are the main clinical findings that can guide the diagnosis of COVID-19. In a cohort study, older adults with mild and/or moderate infection with the new coronavirus were found to have fever as the most frequent symptom (82-87%), followed by coughing (36-66%)⁽⁴⁰⁾. It should be noted that fever may not be present in older adults, referring to the need to investigate other symptoms, such as tiredness and cough⁽⁴⁰⁾. Additionally, most of these studies reported the signs and symptoms of COVID-19 in patients with infection diagnosed in hospitals^(21,26,38,40), which assumes the relevance of advancing knowledge about the dynamics of the disease in older adults in representative population samples and before arriving at the hospital, seeking to prevent hospitalizations and worsening cases.

Considering the severity of the disease and its worst prognosis, the need to disseminate preventive measures for COVID-19 is reinforced in all areas of care, aiming at promoting older adults' rights to life and health. In this regard, COVID-19 prevention among older adults with advanced age should be preferred, requiring interventions that can contain the worsening of the disease, in positive cases, minimizing the occurrence of these outcomes. Teams experienced in geriatrics and gerontology need to be agile in making the most appropriate decision in the context of older adults with advanced age.

Regarding diagnostic findings, computed tomography scans showed greater involvement of the pulmonary lobes⁽³⁶⁻³⁷⁾ and proportion of subpleural line and pleural thickening⁽³⁶⁾; in relation to young people, lower proportion of lymphocytes⁽³²⁾ and lymphocytopenia⁽²⁶⁾. These radiological changes may be absent at the beginning of the disease and be minimal in the mild form⁽²⁵⁾. Therefore, other findings can be considered in the clinical assessment of older adults, such as the lowest proportion of lymphocytes⁽³²⁾ and lymphocytopenia⁽²⁶⁾, as verified in this scoping review.

Thus, clinical signs and imaging tests can guide the diagnosis of COVID-19 and provide early isolation and treatment for older adults. However, no studies were found that offered specific information about the treatment of this disease, showing the relevance of investments in research.

Considering the higher risk of complications and death by COVID-19 among older adults, its protection has been considered a priority action in Brazil⁽⁴¹⁾. In this perspective, in addition to individual clinical focus, it is necessary, in this phase of the pandemic, to advance in reflections and research on the broad geriatric and gerontological approach in caring for older adults, namely: what are the impacts of social isolation for older adults? How to deal with the various situations that disadvantage social mitigation measures in older adults, such as those who live in a context of high social

vulnerability and live alone? What is the relationship between frailty and geriatric syndromes with the occurrence of COVID-19?

Such reflections and investigations are urgent, as they may support health professionals' role in caring for older adults and their families before this pandemic context. Experts from the American Society of Geriatrics stressed the importance of expanding knowledge in gerontology and geriatrics to health professionals to understand the health peculiarities of older adults and their impact on coping with COVID-19⁽⁴²⁾. The Brazilian Society of Geriatrics and Gerontology (SBGG - *Sociedade Brasileira de Geriatria e Gerontologia*), aware of the severity of the disease in older adults with comorbidities, recommends the adoption of measures to restrict social contact, avoiding crowds or trips during the COVID-19 pandemic. Moreover, it encourages that older adults should preferably be cared for at home, avoiding collective exposure in health services and that, in the event of being assisted by caregivers or health professionals, they should be screened for flu-like syndromes. Furthermore, special attention should be given to older adults who live in nursing homes (NHs), as they tend to be more frail⁽⁴³⁾.

In particular, nursing has a decisive role in facing the pandemic of COVID-19, considering that it corresponds to the largest health workforce and, in Brazil, they operate in all health care networks⁽⁴⁴⁾.

Study limitations

The types of studies available in scientific literature, at the beginning of the pandemic, were mostly descriptive and few carried out experimental investigations, testing the main interventions. On the other hand, the studies included in this review were not analyzed for methodological limitations or risk of bias, as proposed for scoping review. These two aspects may have brought together investigations with a low level of evidence; however, they met the proposed objective of presenting an overview of scientific knowledge available worldwide about COVID-19 in older adults.

Contributions to nursing

In this scoping review, no studies were identified that addressed nursing care directed to older adults affected with COVID-19. It is worth mentioning that the year 2020 was chosen to honor the bicentenary of Florence Nightingale, a precursor to modern nursing. Florence worked in the Crimean War⁽⁴⁵⁾ and, from her legacy, nurses have played an essential role in the prevention and control of infections, as well as in social mitigation measures⁽⁴⁶⁾. Such theoretical bases need to be rescued to support nursing professionals' work in coping with COVID-19. The pandemic moment of COVID-19 reinforces the need for nurses to provide qualified and safe gerontological care, through fundamental professional training, and it is essential to develop care actions for older adults, considering, both in present and future scenarios, the particularities and specificities of this population.

CONCLUSION

Most of the research was carried out in China with a retrospective and case study type or case series design. With regard to case reports or case series, most aimed to report the clinical

characteristics, diagnostic findings and treatment perspectives of the first confirmed cases of the disease. As for the other studies, participants ranged from 17 to 13,909 older adults, with heterogeneous selection criteria. Six thematic categories were identified: adverse outcomes/complications resulting from COVID-19, age relationship and greater severity of COVID-19, variables related to death by COVID-19, clinical signs and symptoms, diagnostic findings, and other information.

In general, scientific knowledge about COVID-19 in older adults is still incipient. However, they already indicate high vulnerability of older adults to the worsening of COVID-19 and to complications

resulting from the disease, which includes a higher proportion of hospitalizations in Intensive Care Units and severe pneumonia and a lower proportion of hospital discharge compared to younger people. They also demonstrate that advanced age was related to the occurrence of death. There was also a major episode of COVID-19 infection in older adults, high cost due to deaths from the disease and high occurrence of comorbidities in this population group, when infected. In this context, it is suggested to carry out national surveys with representative samples of older adults in different Brazilian states, in order to contribute to improving health care for older adults before the COVID-19 pandemic.

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